

E F A PROJECTECOLOGY AND ENVIRONMENT, INC.MEMORANDUM REGION VII

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TO. Bill Keffer

THRU Jim Buchanan

FROM: Debbie Kopsick

DATE. March 30, 1982

SUBJECT: Big River Lead Studies Workshop II

On March 25, 1982, I attended the second workshop on the lead contamination and sedimentation problems along the Big River, south, southwest of St. Louis. The purpose of the meeting was to discuss the available results of ten (10) studies conducted on the Big River by various agencies. These are listed in the outline attached. The following report will be a brief review of the important data and conclusions from these studies, presented in the order that each was presented at the conference.

1 Mr. James Czarnecki - Missouri Department of Conservation, Columbia

Mr. Czarnecki gave a brief history of the problems along the Big River. There are four areas identified as the major lead tailings disposal sites along the river:

Leadwood	slurry pond
Desloge	chat pile and slurry pond
Flat River Creek (tributary to Big River)	
	National pile
	St. Joe pile
	Elvins pile
Bonne Terre	2 piles

In all, 675 square miles of tailings are reported to exist along Big River and Flat River Creek.

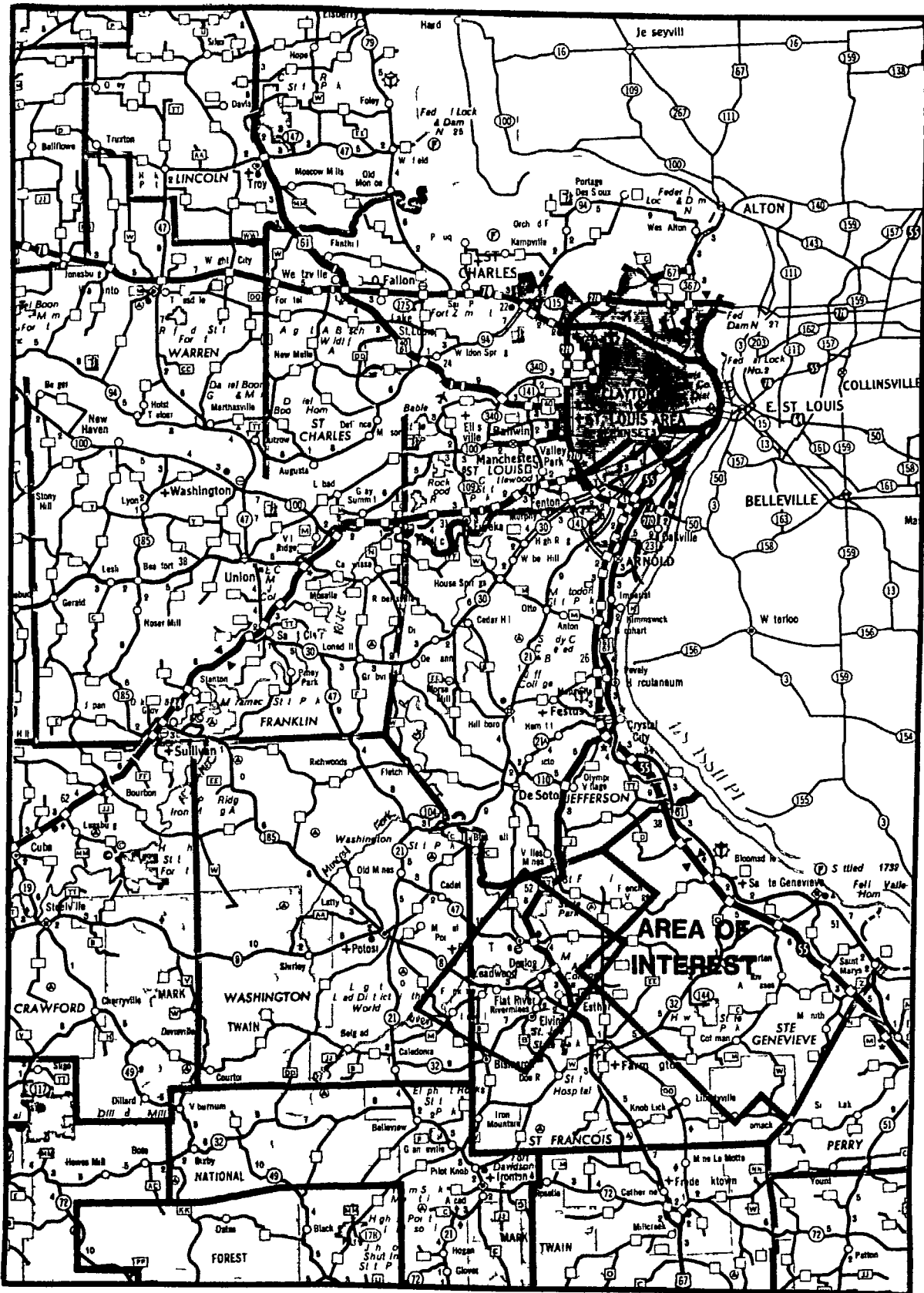
In 1977 a gorge formed in the large slurry pond deposits at Desloge and the dam was breached. The fine grain material flowed like quicksand and was carried into Big River, smothering the river bottom.

In 1979, 1980, and 1981, the Department of Conservation collected fish for lead analysis. Over the 115 mile section of Big River, more lead was detected below the control point of Irondale. The World Health Organization (WHO) recommends 0.3 ppm Pb as a limit for adult consumption. Based on this value, the State of Missouri issued a statement recommending that people do not eat suckers taken from the Big River.

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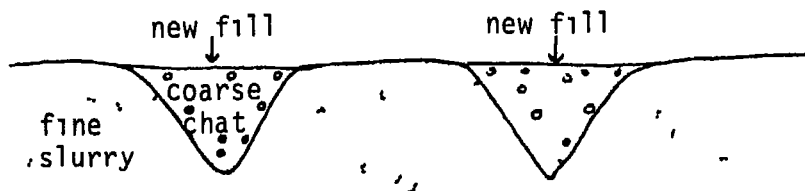


SUPERFUND RECORDS



General area discussed during presentations

In 1982, remedial action began. St Joe Minerals, acting on instructions from the State of Missouri issued in a cooperative agreement, filled the two main gorges formed in the fine material with coarse material from the adjacent chat pile, as represented below



- 2 Howard Marcus for Robert Hentges, Missouri Department of Natural Resources, Columbia

Mr Marcus handed out attached chronology of governmental involvement in Big River tailing pile correction activities. No further explanation was given.

- 3 John Carter, St Joe Minerals

Mr Carter described St Joe's remedial activities at the Desloge pile. The dam was reconstructed with coarse tailings to allow water to leach through the dam into the river. Berms at the site were constructed of fine tailings to prevent seepage. Snow fences were constructed to catch the fines and aid in the heightening of the berms. The company has been encouraging the landfill commission, which operates a sanitary landfill at the site, to place nonreactive trash, (presumably tires and wood) into the voids in the fine material to allow percolation but prevent siltation.

Revegetation attempts have combined 450 lbs of fertilizer/acre with 90 lbs of seed on a 20 acre plot, and achieved limited success. Other piles have been able to sustain good stands of vegetation, and St Joe Minerals is attempting to accomplish this level of success at the Desloge pile.

- 4 Bobby Wixson, University of Missouri at Rolla

Mr Wixson presented chemical data on a stream sediment study supported by St Joe Minerals. There is a difference in concentrations detected in old tailings piles (>7,000-8,000 ppm Pb) compared to newer tailings piles (app 1000-3000 ppm Pb), probably due to more efficient extraction methods in later years. At Leadwood, concentrations of 47,000 ppm Pb were detected in the sediments, while near Desloge, further downstream, concentrations of 1100-1800 ppm P were detected. Mr Wixson

stated that an ore body may be outcropping at the Leadwood site, causing the high concentrations. A sediment sample from a riffle area in Flat River Creek showed concentration of 173,000 ppm Pb, 39,000 ppm Zn and 770 ppm Cd. Sediment samples collected near Elvins showed 3000-4000 ppm Pb, while at the National pile 2000 ppm Pb were detected at the pile and 7000 ppm Pb downstream from the pile. Near the Desloge dam break 2000-2500 ppm Pb were detected in Big River sediments. It was concluded that the fine lead tailings in the river are being carried downstream by storms, with this movement being controlled by river velocity.

5 Nord Gale - University of Missouri, Rolla

Mr. Gale discussed a study on fish collected in the Big River. Fish collected during a July sampling showed higher concentrations than those collected in April or October. An explanation may be that aquatic vegetation or feeding habits may vary during the summer months. The point was made by Mr. Gale that many fish around the world are above the 0.3 ppm Pb WHO standard and that the levels in Big River fish may not actually pose a public health threat even though they exhibit levels above this limit. Mr. Gale also expressed the view that the National pile is much more eroded than the Desloge pile, and may be a much more significant problem. A published study indicates that there is no adverse effect from ingesting 1000 mg per day Pb, whereas 2000 mg per day Pb will show some adverse effect.

The draft of the work of Wixson and Gale has been presented to St. Joe Minerals for review. A public release date is not known at this time.

6 Marc Imlay - representing the Sierra Club and Friends of the Earth

Mr. Imlay discussed whether a species of Big River crayfish was a threatened species and concluded that, if all remains constant, the species should thrive. Further release of fine grained tailings, movement of tailings downstream into Washington State Park (a major habitat) or the encroachment of St. Louis could threaten the species.

7 Richard Atkinson - University of Missouri, Columbia

Mr. Atkinson discussed Pb levels in organisms. Pb concentrations were greatest in frogs, followed in order by snakes, muskrats and herons. Cd was detected in muskrats at concentrations of 2.79 ppm, but not detected in snakes. Mn and Pb were not significantly higher in downstream samples. Levels for Pb measured ranged from <0.10 to 15.97 ppm. The high value was found at Browns Ford, downstream of Desloge.

8 Christopher Schmitt- Columbia National Fisheries Research Laboratory

Mr. Schmitt discussed sediment studies conducted along Mineral Fork and Big River. An elaborate collection system for fine material was devised using a vacuum system, in which most organic carbon was excluded. Five extracts were derived from the sediment samples and included carbonate, exchangeable, residual, organic and oxide, totalling 100 percent of the sample. The carbonates and iron and manganese oxides

were found to contribute the majority of the lead. A pH change will mobilize the metals. It was found that most of the lead was in a carbonate matrix, with lead sulfide rapidly oxidized to lead oxide. Not much lead sulfide, the primary ore, is said to exist in the tailings. Some total Pb dry weight concentrations presented were

2215 ppm	Desloge
291 ppm	Mineral Fork
1438 ppm	Browns Ford
1776 ppm	Tailings sample
49.6 ppm	Irondale (used as a control site in most experiments)
1843 ppm	Washington State Park

9 Gary Whelan - University of Missouri, Columbia

Mr. Whelan discussed benthic invertebrates. Old detritus (leaves) exhibited 3000 ug/g (ppm) Pb. Weathered detritus showed high concentrations downstream of 7000 ug/g.

10 Mike Klosterman - U S Army Corps of Engineers, St. Louis District

Mr. Klosterman discussed the extent of the tailings problem in this region and located 8 lead tailings sites and 51 barite dams through aerial photography. It was estimated that 200 million tons of lead tailings exist. These sites were ranked according to potential for stability problems. In case of a dam failure, the 12 active barite sites and 5 inactive barite sites would have a significant potential impact on the environment. Through runoff and dam failure, all 8 lead tailings piles would cause an environmental problem.

For the barite tailing sites, alternatives included

- 1 on-site containment - cheapest and most feasible
- 2 moving river channel
- 3 removing tailings
- 4 in-stream collection of tailings

It was estimated that alternative #1 would cost \$20 million for 20 sites. This figure includes design, real estate costs, construction and maintenance.

For the lead tailing sites, the alternatives include

- 1 trap surface runoff and particulates in sedimentation ponds
- 2 reduce slope of pile
- 3 widen spillways
- 4 on-site drainage channels changes
- 5 covering of slope with fiber cloth (geotextile) and rip-rap
- 6 revegetation

A total of \$55 million for all eight sites was put forth by the Corps last week and includes elements of all the alternatives mentioned above. It is estimated by the Corps that this remedial action will be 90% effective during periods of high flow.

The Corps is recommending that Congress appropriate \$75 million to solve the tailings problems in this area of Missouri. This is being done as part of the Pine Fork project, but not in connection with the Pine Fork Dam, which according to Mr. Klosterman, the Corps is not going to recommend the construction of.

Concern was also expressed about the permitted sanitary landfill operating within the Desloge tailings pile, however, it was not discussed by any of the speakers. It was mentioned, in informal conversation, that the alkaline leachates from the landfill may mobilize the metals in the tailings.

The workshop was a very worthwhile attempt to coordinate a number of different federal and state agencies for the sole purpose of dissemination of data. Further information is available from the speakers if the need arises at some future time.

Deborah Kopsick

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Enclosures



BIG RIVER LEAD STUDIES WORKSHOP II

10 00 a m

March 25, 1982

Room No 311, Hearnes Multipurpose Building
University of Missouri - Columbia

PURPOSE

To provide a forum for the interchange of information, ideas, and study results regarding the lead and sedimentation problems in Big River below the Desloge tailings deposit

PROGRAM

The following people will make 15 minute presentations about their studies or particular area of expertise

Mr James M Czarnecki, Water Quality Research Biologist,
Missouri Department of Conservation-Columbia

Mr Robert Hentges, Chief of Permit Section, Missouri
Department of Natural Resources-Jefferson City

Mr John Carter, Environmental Control Engineer, St Joe
Minerals Corp , Viburnum, Missouri

Dr Bobby G Wixson, Professor of Environmental Health,
University of Missouri-Rolla

Dr Nord L Gale, Professor of Life Sciences, University
of Missouri-Rolla

Dr Marc J Imlay, Head, Greater Ozarks Endangered Species
Task Force-Columbia

Mr Richard Atkinson, Research Specialist, University of
Missouri-Columbia

Mr Gary E Whelan, Research Assistant, University of
Missouri-Columbia

Dr Christopher J Schmitt, Fisheries Ecologist, Columbia
National Fisheries Research Laboratory

Mr Mike Klosterman, Geological Engineer, St Louis District,
U S Army Corps of Engineers

DISCUSSION

We plan to have 5 minutes of discussion following each presentation After the formal presentations, we can have open discussion or break up into smaller interest groups

SPONSORSHIP

This workshop is cosponsored by the Missouri Department of Conservation, the School of Forestry, Fisheries, and Wildlife, University of Missouri-Columbia and the U S Fish and Wildlife Service through the Missouri Cooperative Wildlife and Fishery Units, and the St Louis District, U S Army Corps of Engineers.

GOVERNMENTAL INVOLVEMENT IN THE BIG RIVER TAILING PILE
CORRECTION ACTIVITIES

July, 1977	DOC report that Dam had failed
July, 1977	DNR contacted involved landowners St Francois County landfill, Scottish Rights Foundation, and St Joe Mineral
August 1, 1977	St Francois County Landfill began corrective actions to fill in gap- placing Demo
August, 1977	St Joe offered 35,000 cubic yards of fill material from adjacent site to correct breechs (No moving expenses)
October, 1977	DNR requested assistance from St Louis COE
November, 1977	COE stated that lacked assistance congressional authorization to under- take any repairs
December, 1977	DOC & DNR correspondence attempting to set up meeting of COE to discuss possible lawsuits
December, 1977	Letter from COE to St Joe requesting they correct problem & threat of legal action under section 404 of CWA
January, 1978	Meeting held DOC DNR & COE COE was sending discovering letter to St Joe citing violation of Refuse Act
February, 1978	St Joe Denied Refuse Act violation's claims made by COE
March 7, 1978	Meeting of DOC, DNR to establish a coordinated state action on problem
March 8, 1978	Letter's sent to following by DNR to seek methods of correcting problems U S Fish & Wildlife Service, Kansas City Coast Guard, St Louis Soil Conservation Service, Columbia EPA, Kansas City
March 13, 1978	Carbon copies to entire congressional delegations { St Joe offered Rock again for filling Breechs

March 20, 1978	Soil Conservation response--could not assist direct, but might try local office
March 24, 1978	Coast Guard response to try EPA
March 29, 1978	Fish & Wildlife could not offer assistance, but they wanted to be kept informed
April 11, 1978	Follow-up letter to EPA
April 19, 1978	Response from EPA stating we had the authority to issue the trailing pile operator an NPDES permit No financial assistance
April , 1978	CWC (DNR) referred the matter to Governor Teasdale & requested he enlist the Army Reserve to correct the problem It was suggested that the 471st Engineering Construction Support Company at Rolla could do the work
June, 1978	Governor Teasdale request Federal help through Tom Eagleton's office
	Not sure of the Governor's office correspondence However, Governor Teasdale was told to use the National Guard
July 6, 1978	Meeting held in Governor's office with DOC, DNR, and the National Guard
July 10, 1978	35th Engineering Brigade Detachment from Fort Wood was given orders to prepare a feasibility plan
Time Unknown	National Guard completed study & concluded "that due to the complexity of the problem and unique nature of the technical problems that particular expertise was highly desirable in resolving the problem He further recommended a private consultant be sought to recommend alternatives for the solutions
End, 1978	No additional action by Governor's office
February, 1979	DNR requested permission from Governor to return file
February, 1979	DNR started negotiations with University of Missouri, Rolla to conduct an engineering survey

After a period of time, contract was finally signed with University of Missouri, Columbia for Dr Novak to conduct the study

Study proceed through summer of 1979 with a final report being prepared in January, 1980

August, 1979

DOC & DNR studied various options to implement the Novak report when it was received

February, 1980

Dick Rankin was appointed by Fred Lafser to be project coordinator

March 1980

Larry Gale appointed Chuck Purkett to act as DOC chairman on project

Decision was made to work with St Joe to get problem fixed, some how

April, 1980

Meeting with DOC, DNR, & St Joe

October 2 1980

Governor Teasdale contacted St Joe's, Chairman of the Board, & requested financial assistance

October 8, 1980

St Joe offered 50/ of the corrective cost

October, 1980

Negotiated with St Joe for 100/ of cost and a covenant not to sue

November 18, 1980

Governor Teasdale sent St Joe letter detailing the terms that had been worked out by staff

1981

"Lengthy discussions on Covenant not to sue"

July 21, 1981

St Joe completed their report

Repair of Dam at Desloge, landfill along Big River

September 4, 1981

Covenant not to sue completed and signed by

- 1 John Ashcroft - Attorney General's office
- 2 Larry Gale - Depart of Conservation
- 3 Fred Lafser - Depart of Nat Resources
- 4 Richard Rankin - MO Clean Water Com
- 5 John Wrights - St Joe
- 6 John Cavanaugh - Landfill

St Joe proceeded with bidding procedures
to fix the problem

Difficulties arose on Repair of Dam at
Desloge, Landfill along Big River repair
document

tober 1, 1981

Covenant not to sue was amended allowing
the contractor to utilize a different
method to correct the breaches

Work completed by Contractor

January 19, 1982

Campaign flight provided by DOC to view
completed work on repair of Breachs

January 20, 1982

Final report made to Missouri Clean
Water Commission on repair by myself

January 22, 1982

Final report made to Conservation
Commission by Dr Whitley

CASE CLOSED